

Amendments to the Specification:

Please replace the Abstract with the following amended Abstract:

A cellular automaton cache memory architecture. On a general-purpose processor, a cache memory is provided to store instructions and data for use by the processor. The cache memory is further capable of storing data representing a first state of a cellular automaton at a first time step, where the data is organized in cells. A cellular automaton update unit provides data from selected cells of the cellular automaton to an update engine. The update engine includes a microprocessor execution unit capable of executing at least some general purpose microprocessor instructions and updates at least some of the selected cells according to an update rule and a state of any associated neighborhood cells to provide a state of the cellular automaton at a second time step. For one aspect, the memory, the update unit and the update engine are implemented on a single integrated circuit chip.